

CLAIMS

1. A game system comprising a first game execution apparatus
and a second game execution apparatus which each execute
5 a game in accordance with a game program, and a portable
storage medium,

wherein the first game execution apparatus converts
first image data to second image data and outputs the second
image data, the first image data being suited for use in
10 the first game execution apparatus, and the second image
data being suited for use in the second game execution
apparatus,

the portable storage medium acquires the second image
data from the first game execution apparatus and stores
15 the second image data, and outputs the second image data
according to a request by the second game execution
apparatus, and

the second game execution apparatus acquires a game
program suited for use in the second game execution
20 apparatus, requests and acquires the second image data
from the portable storage medium, executes a game in
accordance with the acquired game program, and generates
an image from the acquired second image data and displays
the generated image in accordance with progression of the
25 game.

2. The game system of Claim 1,

wherein the portable storage medium further acquires the game program suited for use in the second game execution apparatus from the first game execution apparatus and stores the game program, and if game software that includes the game program and the second image data is permitted to be used by the second game execution apparatus, outputs the game software according to the request by the second game execution apparatus.

3. The game system of Claim 2,

wherein if the game software is permitted to be copied to the portable storage medium, the portable storage medium acquires the game software from the first game execution apparatus.

4. A game execution apparatus for executing a game in accordance with a game program, comprising:

a conversion unit operable to convert first image data suited for use in the game execution apparatus, to second image data suited for use in another game execution apparatus; and

an output unit operable to output the second image data to a portable storage medium.

5. The game execution apparatus of Claim 4, further comprising:

an acquisition unit operable to acquire display
5 information showing a display capacity of a display device
equipped in the other game execution apparatus, from the
portable storage medium,

wherein the conversion unit converts the first image
data to the second image data based on the display
10 information.

6. The game execution apparatus of Claim 5,

wherein the display information shows a number of
pixels of a monitor included in the display device.

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7. The game execution apparatus of Claim 5,

wherein the display information shows a clock rate
of a control unit included in the display device.

20 8. The game execution apparatus of Claim 5,

wherein the display information shows a data transfer
rate of a bus included in the display device.

9. The game execution apparatus of Claim 4, further

25 comprising:

an acquisition unit operable to acquire available memory information showing an available memory size of the portable storage medium, from the portable storage medium,

5 wherein the conversion unit converts the first image data to the second image data that is within the available memory size shown by the available memory information.

10. The game execution apparatus of Claim 4,

10 wherein the first image data represents an object by a free-form surface, and the second image data represents the object by a polygon; and

 the conversion unit generates the polygon from the free-form surface.

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11. The game execution apparatus of Claim 10,

 wherein the conversion unit generates the polygon from the free-form surface, by setting polygon vertices at a predetermined interval in a part of the free-form surface that has curvedness no smaller than a predetermined value, and setting polygon vertices at an interval greater than the predetermined interval in a part of the free-form surface that has curvedness smaller than the predetermined value.

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12. The game execution apparatus of Claim 11, further comprising:

an acquisition unit operable to acquire at least one of display information and available memory information from the portable storage medium, the display information showing a display capacity of a display device equipped in the other game execution apparatus, and the available memory information showing an available memory size of the portable storage medium,

10 wherein the conversion unit includes:

a setting unit operable to set a lower-limit curvature and an upper-limit polygon side length based on the acquired display information or available memory information;

a control unit operable to, for each curve that represents the free-form surface, determine a start point of the curve as a polygon vertex, move a target point along the curve from the start point to an end point of the curve by a predetermined distance, and have a calculation unit, a judgment unit, and a determination unit perform
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20 respective operations each time the target point is moved by the predetermined distance;

the calculation unit operable to calculate a cumulative curvature at the target point from an immediately preceding polygon vertex, by adding a curvature
25 at the target point to a cumulative curvature calculated

immediately before the target point is moved by the predetermined distance;

the judgment unit operable to judge whether the cumulative curvature at the target point is no smaller than the lower-limit curvature and whether a distance from the immediately preceding polygon vertex to the target point is no smaller than the upper-limit polygon side length;

the determination unit operable to determine the target point as a polygon vertex, if the cumulative curvature at the target point is no smaller than the lower-limit curvature or if the cumulative curvature is smaller than the lower-limit curvature but the distance is no smaller than the upper-limit polygon side length; and

a polygon generation unit operable to generate the polygon based on coordinates of determined polygon vertices, after the target point has been moved from the start point to the end point of each curve representing the free-form surface.

13. The game execution apparatus of Claim 12,

wherein the setting unit selects the lower-limit curvature and the upper-limit polygon side length which correspond to the display capacity shown by the display

information, from a conversion table that shows a correspondence between display capacities and lower-limit curvatures and upper-limit polygon side lengths.

5 14. The game execution apparatus of Claim 13,

wherein if the second image data generated by the conversion unit exceeds the available memory size shown by the available memory information, the setting unit increases the lower-limit curvature and the upper-limit
10 polygon side length.

15. The game execution apparatus of Claim 13,

wherein the setting unit holds the conversion table.

15 16. The game execution apparatus of Claim 13,

wherein the setting unit reads the first image data and the conversion table corresponding to the first image data, from a game storage medium.

20 17. The game execution apparatus of Claim 10, further comprising:

an acquisition unit operable to acquire available memory information showing an available memory size of the portable storage medium, from the portable storage
25 medium,

wherein if the second image data exceeds the available memory size shown by the available memory information, the conversion unit regenerates a rougher polygon from the free-form surface.

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18. The game execution apparatus of Claim 10, further comprising:

an acquisition unit operable to acquire display information or available memory information from the portable storage medium, the display information showing
10 a display capacity of a display device equipped in the other game execution apparatus, and the available memory information showing an available memory size of the portable storage medium,

15 wherein the conversion unit selects, from a conversion table that shows a correspondence between input values for determining polygon roughness and display capacities or available memory sizes, an input value corresponding to the display capacity shown by the acquired
20 display information or the available memory size shown by the acquired available memory information, and generates the polygon using the selected input value.

19. The game execution apparatus of Claim 18,

25 wherein the conversion unit holds the conversion

table.

20. The game execution apparatus of Claim 18,

wherein the conversion unit reads the first image
5 data and the conversion table corresponding to the first
image data, from a game storage medium.

21. The game execution apparatus of Claim 4, further
comprising:

10 a holding unit operable to hold a first game program
suited for use in the game execution apparatus, and a second
game program for executing a same game as the first game
program and suited for use in the other game execution
apparatus,

15 wherein the output unit outputs the second game
program to the portable storage medium.

22. A portable storage medium that is removably connectable
to a first game execution apparatus and a second game
20 execution apparatus which each execute a game in accordance
with a game program, comprising:

an acquisition unit operable to acquire second image
data generated by converting first image data from the
first game execution apparatus, the first image data being
25 suited for use in the first game execution apparatus, and

the second image data being suited for use in the second game execution apparatus;

a storage unit operable to store the acquired second image data; and

5 an output unit operable to output the second image data stored in the storage unit to the second game execution apparatus, according to a request by the second game execution apparatus.

10 23. The portable storage medium of Claim 22,

wherein the acquisition unit acquires game software that includes the second image data from the first game execution apparatus, and stores the acquired game software to the storage unit,

15 the portable storage medium further comprises:

a holding unit operable to hold management information for managing use of the game software; and

a judgment unit operable to judge whether the game software is permitted to be used according to the management information, when the second game execution apparatus requests the game software, and

the output unit outputs the game software to the second game execution apparatus, if the judgment unit judges that the game software is permitted to be used.

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24. The portable storage medium of Claim 23,

wherein the acquisition unit acquires the management information corresponding to the game software, from the first game execution apparatus, and

5 the holding unit holds the acquired management information.

25. The portable storage medium of Claim 23,

wherein the holding unit holds, as the management
10 information, valid period information showing a valid period during which the game software is permitted to be used,

the judgment unit judges whether the valid period shown by the valid period information has not passed, and

15 the output unit outputs the game software to the second game execution apparatus, if the judgment unit judges that the valid period has not passed.

26. The portable storage medium of Claim 25,

20 wherein the acquisition unit acquires additional valid period information showing an additional valid period during which the game software is permitted to be used, and

the holding unit updates the valid period information,
25 by adding the additional valid period shown by the

additional valid period information to the valid period shown by the valid period information.

27. The portable storage medium of Claim 23,

5 wherein the holding unit holds the management information in an area that is inaccessible from outside the portable storage medium.

28. The portable storage medium of Claim 23,

10 wherein the holding unit further holds copy information showing whether the game software is permitted to be copied to the portable storage medium,

 the judgment unit further judges whether the game software is permitted to be copied to the portable storage
15 medium, based on the copy information, and

 the acquisition unit acquires the game software from the first game execution apparatus, if the judgment unit judges that the game software is permitted to be copied to the portable storage medium.

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29. The portable storage medium of Claim 28,

 wherein the copy information shows a number of times the game software is permitted to be copied to the portable storage medium,

25 the judgment unit judges whether the number shown

by the copy information is no less than 1, and

if the judgment unit judges that the number is no less than 1, the acquisition unit acquires the game software from the first game execution apparatus and then decrements
5 the number by 1.

30. The portable storage medium of Claim 29,

wherein the acquisition unit acquires the copy information from an external management device, and
10 the holding unit holds the acquired copy information.

31. The portable storage medium of Claim 29,

wherein the acquisition unit acquires additional copy information showing an additional number of times the game software is permitted to be copied to the portable storage
15 medium, from an external management device, and

the holding unit updates the copy information by adding the additional number shown by the additional copy information to the number shown by the copy information.
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32. The portable storage medium of Claim 29,

wherein the acquisition unit acquires a copy program which describes a procedure of copying the game software to the portable storage medium, from an external management
25 device.

33. A game execution apparatus for executing a game in accordance with a game program, comprising:

a read unit operable to read, from a portable storage medium, second image data generated by converting first image data, the second image data being suited for use in the game execution apparatus, and the first image data being suited for use in another game execution apparatus;

an acquisition unit operable to acquire a game program suited for use in the game execution program; and

a game execution unit operable to execute a game in accordance with the acquired game program, and generate an image from the acquired second image data and display the generated image in accordance with progression of the game.

34. The game execution apparatus of Claim 33, further comprising:

an output unit operable to output display information showing a display capacity of the game execution apparatus, according to a request by the portable storage medium.

35. The game execution apparatus of Claim 34,

wherein the output unit outputs, as the display information, a number of pixels of a display device in

the game execution apparatus, a clock rate of a control unit in the game execution apparatus, or a data transfer rate of a bus in the game execution apparatus.

5 36. The game execution apparatus of Claim 33,

wherein the acquisition unit acquires permission information for granting use of game software that includes the second image data and the game program and is stored on the portable storage medium, from an external server
10 device through communication, and

the game execution unit uses the game software, if the acquisition unit acquires the permission information.

37. The game execution apparatus of Claim 36,

15 wherein the permission information is a decryption key for decrypting the game software which has been encrypted, and

the game execution apparatus further comprises:

a decryption unit operable to decrypt the encrypted
20 game software using the decryption key.